

**RESOLUTION COM4-19 (WRC-97)**

**PROVISIONAL APPLICATION OF Nos. S11.24 AND S11.26 OF THE  
RADIO REGULATIONS ADOPTED BY WRC-97 WITH REGARD TO  
HIGH ALTITUDE PLATFORM STATIONS**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that WRC-97 has made provision for the operation of high altitude platform stations within the fixed service in the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz;
- b) that the Radio Regulations Board issued a provisional rule of procedure concerning notification periods in No. S11.24 (RR 1228) in February 1997, pending a final decision by WRC-97;
- c) that WRC-97 modified No. S11.24 and added No. S11.26 of the Radio Regulations to the effect that notices relating to assignments for high altitude platform stations in the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz "shall reach the Bureau not earlier than five years before the assignments are brought into use";
- d) that Resolution COM5-7 (WRC-97) gives the Bureau instructions concerning the treatment of notices for high altitude platform stations as from 22 November 1997,

*resolves*

that the provisions of Article S11 (Nos. S11.24 and S11.26) shall be applied by the Radiocommunication Bureau and by administrations on a provisional basis from 22 November 1997.

RESOLUTION COM4-20 (WRC-97)

**UPDATING OF THE "REMARKS" COLUMNS IN THE TABLES OF ARTICLE 9A  
OF APPENDIX 30A AND ARTICLE 11 OF APPENDIX 30**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that WRC-97 has adopted new texts relating to the symbols in the "Remarks" columns of Article 9A of Appendix 30A and Article 11 of Appendix 30;
- b) that WRC-97 has adopted new entries in the "Remarks" columns of Article 9A of Appendix 30A and Article 11 of Appendix 30, on the understanding that the lists of identified administrations will be reviewed and revised, as appropriate, by WRC-99;
- c) that studies of compatibility between the revised Regions 1 and 3 BSS (downlink and feeder link) Plans, and other services having allocations in the planned bands in all three Regions, and between the revised Regions 1 and 3 Plan and the Region 2 Plan, were performed during WRC-97 using data which had been received and published by the Bureau at the time of WRC-97 under relevant provisions of the Radio Regulations;
- d) that because it was not possible to analyse fully the effect of all assignments which were received before 27 October 1997 but which had not been processed at the time of WRC-97;
- e) that in order to analyse fully the effect of assignments that have not been fully processed, it is necessary to process the assignments which have been received prior to WRC-97,

*recognizing*

- a) that the revised Regions 1 and 3 Plan must be compatible with the Region 2 Plan and with the other services which have primary allocations in the planned bands in all three Regions in accordance with principles adopted at WRC-97;
- b) that the Radiocommunication Bureau requires clear instructions from WRC-97 on how to complete the analyses and to finalize the entries to be included in the "Remarks" column of both Article 9A of Appendix 30A and Article 11 of Appendix 30;
- c) that the instructions to the Bureau shall take effect on 22 November 1997,

*resolves*

- 1 that the Radiocommunication Bureau shall complete the required analyses based on the new Notes (3 to 7) to Article 9A of Appendix 30A and Notes (5 to 7) to Article 11.2 of Appendix 30 added during this Conference;
- 2 that the Radiocommunication Bureau shall publish the results of its analyses after the Conference, together with a modified "Remarks" column of Article 9A of Appendix 30A and Article 11 of Appendix 30, in the form of a circular-letter;
- 3 that once the circular-letter referred to in *resolves* 2 has been sent, administrations will have a period of 60 days to decide whether they do or do not wish to go on appearing as "affected administrations" in the relevant table. If no reply is received from administrations within that period, it will be taken that there is no need to make any change;
- 4 that the new coordination requirements identified in the above-mentioned circular-letter shall apply provisionally from the date of the above-mentioned circular-letter until a decision is taken by WRC-99;
- 5 that the Radiocommunication Bureau shall report the results of its analyses and the final lists of administrations to be included in the modified "Remarks" columns to WRC-99,

*instructs the Secretary-General*

to bring this Resolution to the attention of the Council, at its next session, with a view to including this item on the agenda of WRC-99.

RES COM4-21 (Not used)

RES COM4-22 (Not used)

**RESOLUTION COM4-23 (WRC-97)**  
**OPERATION OF BROADCASTING SATELLITES**  
**SERVING OTHER COUNTRIES**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) the institutional nature of ITU which is founded on an agreement between its Member States;
- b) the treaty status of the Plans in Appendices S30 and S30A;
- c) that these Plans were established on the basis of planning principles which included, *inter alia*, that the Plans should be based mainly on national coverage;
- d) the increasing number of applications under Article 4 for modifications to the Plans, leading to many multinational systems;
- e) that No. S23.13/2674 requires that: "in devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum extent practicable, the radiation over the territory of other countries unless an agreement has been previously reached with such countries",

*recognizing*

- a) that current technology provides opportunities to implement broadcasting-satellite systems with service areas that exceed national coverage;
- b) that several such systems have been implemented and others are being planned;
- c) that successful Article 4 coordination of such systems does not in any way imply licensing authorization to provide a service within the territory of a Member State,

*resolves*

that, in addition to observing No. S23.13/2674, and before providing satellite broadcasting services to other administrations, administrations originating the services should obtain the agreement of those other administrations.

**RESOLUTION COM5-3 (WRC-97)**

**USE OF THE FREQUENCY BAND 5 250 - 5 350 MHz BY  
SPACEBORNE ACTIVE SENSORS**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the frequency band 5 250 - 5 350 MHz is allocated to the radiolocation service on a primary basis;
- b) that the frequency band 5 250 - 5 350 MHz is also allocated to the earth exploration-satellite (active) and the space research (active) services on a primary basis;
- c) that the Report of the Conference Preparatory Meeting to WRC-97 concluded that terrestrial radars would not cause unacceptable interference to synthetic aperture radars, scatterometers or altimeters, and that active spaceborne sensors and radiolocation systems are compatible provided that spaceborne-synthetic aperture radar and scatterometer design parameters are appropriately selected to ensure compatibility with radiolocation systems;
- d) that guidelines for the appropriate selection of these parameters are contained in Recommendation ITU-R SA.1280;
- e) that spaceborne sensors have operated in this frequency band since 1991 with no known reports of interference;
- f) that many administrations have radiolocation systems operating in this band,

*resolves*

- 1 to invite ITU-R to study, as a matter of urgency, specific sharing criteria and emission characteristics for spaceborne active sensors operating in this frequency band, which may be added to Recommendation ITU-R SA.1280;
- 2 that when developing spaceborne active sensors operating in this frequency band, administrations should take into account the guidelines for the design of spaceborne active sensors found in Recommendation ITU-R SA.1280.

RESOLUTION COM5-4 (WRC-97)

**USE OF THE FREQUENCY BAND 5 350 - 5 460 MHz  
BY SPACEBORNE ACTIVE SENSORS**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the frequency band 5 350 - 5 460 MHz is allocated to the aeronautical radionavigation service on a primary basis;
- b) that the frequency band 5 350 - 5 460 MHz is also allocated to the earth exploration-satellite (active) service on a primary basis;
- c) that the Report of the Conference Preparatory Meeting to WRC-97 concluded that spaceborne altimeters and aeronautical radionavigation systems are compatible in this frequency band;
- d) that the Report of the Conference Preparatory Meeting to WRC-97 concluded that spaceborne synthetic aperture radars and airborne weather radars operating in the aeronautical radionavigation service are compatible in this frequency band;
- e) that guidelines for the appropriate selection of design parameters of active spaceborne sensors are contained in Recommendation ITU-R SA.1280,

*resolves*

to invite ITU-R to study specific sharing criteria and emission characteristics for spaceborne active sensors operating in the frequency band 5 350 - 5 460 MHz, with a view to providing further guidance on the matter of compatibility with aeronautical radionavigation systems which will assist in the design of spaceborne active sensors and may add to Recommendation ITU-R SA.1280.

RESOLUTION COM5-5 (WRC-97)

**IMPLEMENTATION OF WIND PROFILER RADARS**

The World Radiocommunication Conference (Geneva, 1997),

*having noted*

a request to ITU from the Secretary-General of the World Meteorological Organization (WMO), in May 1989, for advice and assistance in the identification of appropriate frequencies near 50 MHz, 400 MHz and 1 000 MHz in order to accommodate allocations and assignments for wind profiler radars,

*considering*

- a) that wind profiler radars are vertically-directed Doppler radars exhibiting characteristics similar to radiolocation systems;
- b) that wind profiler radars are important meteorological systems used to measure wind direction and speed as a function of altitude;
- c) that it is necessary to use frequencies in different ranges in order to have options for different performance and technical characteristics;
- d) that, in order to conduct measurements up to a height of 30 km, it is necessary to allocate frequency bands for these radars in the general vicinity of 50 MHz (3 to 30 km), 400 MHz (500 m to about 10 km) and 1 000 MHz (100 m to 3 km);
- e) that some administrations have either already deployed, or plan to expand their use of, wind profiler radars in operational networks for studies of the atmosphere and to support weather monitoring, forecasting and warning programmes;
- f) that the ITU radiocommunication study groups have studied the technical and sharing considerations between wind profiler radars and other services allocated in bands near 50 MHz, 400 MHz and 1 000 MHz,

*considering further*

- a) that some administrations have addressed this matter nationally by assigning frequencies for use by wind profiler radars in existing radiolocation bands or on a non-interference basis in other bands;
- b) the work of the Voluntary Group of Experts on the Allocation and Improved Use of the Radio Frequency Spectrum and Simplification of the Radio Regulations supports increased flexibility in the allocation of frequency spectrum,

*noting in particular*

- a) that wind profiler radars operating in the meteorological aids service in the band 400.15 - 406.0 MHz interfere with satellite emergency position-indicating radio beacons operating in the mobile-satellite service in the band 406.0 - 406.1 MHz under No. S5.266;
- b) that in accordance with No. S5.267, any emission capable of causing harmful interference to the authorized uses of the band 406 - 406.1 MHz is prohibited,

*resolves*

1 to urge administrations to implement wind profiler radars as radiolocation service systems in the following bands, having due regard to the potential for incompatibility with other services and assignments to stations in these services, thereby taking due account of the principle of geographical separation, in particular with regard to neighbouring countries, and keeping in mind the category of service of each of these services:

46 - 68 MHz in accordance with No. S5.162A

440 - 450 MHz

470 - 494 MHz in accordance with No. S5.291A

904 - 928 MHz in Region 2 only

1 270 - 1 295 MHz

1 300 - 1 375 MHz;

2 that, in case compatibility between wind profiler radars and other radio applications operating in the band 440 - 450 MHz or 470 - 494 MHz cannot be achieved, the bands 420 - 435 MHz or 438 - 440 MHz could be considered for use;

3 to urge administrations to implement wind profiler radars in accordance with Recommendations ITU-R M.1226, ITU-R M.1085-1 and ITU-R M.1227 for the frequency bands around 50 MHz, 400 MHz and 1 000 MHz, respectively;

4 to urge administrations not to implement wind profiler radars in the band 400.15 - 406 MHz; and

5 to urge administrations currently operating wind profiler radars in the band 400.15 - 406.0 MHz to discontinue them as soon as possible,

*instructs the Secretary-General*

to bring this Resolution to the attention of ICAO, IMO and WMO.

RES COM5-6

(Not used)

**RESOLUTION COM5-7 (WRC-97)**

**USE OF THE BANDS 47.2 - 47.5 GHz AND 47.9 - 48.2 GHz BY  
HIGH ALTITUDE PLATFORM STATIONS IN THE FIXED  
SERVICE AND BY OTHER SERVICES**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the band 47.2 - 50.2 GHz is allocated to the fixed, mobile and fixed-satellite services on a co-primary basis;
- b) that WRC-97 has made provision for operation of high altitude platform stations, also known as stratospheric repeaters, within the fixed service in the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz;
- c) that ITU has among its purposes "to promote the extension of the benefit of the new telecommunication technologies to all the world's inhabitants" (No. 6 of the Constitution of the ITU (Geneva, 1992));
- d) that systems based on new technologies using high altitude platforms will be able to provide high-capacity, competitive services to urban and rural areas;
- e) that high altitude platform systems are in an advanced stage of development and some countries have notified such systems to ITU;
- f) that the Radio Regulations Board issued a provisional rule of procedure concerning notification periods in No. S11.24 (RR 1228) in February 1997, pending a final decision by WRC-97;
- g) that in spite of the urgency attached to the development of such systems, technical, sharing and regulatory issues should be studied in order to achieve the most efficient use of the spectrum available for these systems;
- h) that technical studies are required in order to ascertain the extent to which sharing of the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz is feasible between systems using high altitude platforms in the fixed service and systems in the fixed, fixed-satellite and mobile services, and to ascertain the requirements to protect radio astronomy services in adjacent bands from spurious emissions;
- i) that the radio astronomy service has primary allocations in the bands 42.5 - 43.5 GHz and 48.94 - 49.04 GHz;
- j) that ITU-R studies are already under way on the preferred characteristics of systems using high altitude platforms and the feasibility of sharing between these systems and systems of other services and between these systems and other systems in the fixed service (Questions ITU-R 212/9, ITU-R 218/9 and ITU-R 251/4);

k) that No. S5.552 urges administrations to reserve fixed-satellite service use of the band 47.2 - 49.2 GHz for feeder links for the broadcasting-satellite service, and that preliminary ITU-R studies indicate that high altitude platform stations in the fixed service may share with broadcasting-satellite feeder links;

l) that the development of services using high altitude platform stations in these bands requires major investment and that manufacturers and operators should be given the confidence to make the necessary investment in these applications,

*resolves*

1 to urge administrations to facilitate coordination between high altitude platform stations in the fixed service operating in the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz and other co-primary services in their territory and adjacent territories;

2 that, on a provisional basis, the procedures of Article S9 shall be used for coordination between satellite systems and high altitude platform systems;

3 to request ITU-R to carry out urgently studies on the appropriate technical sharing criteria for the situations referred to in *considering h*), with priority given to the sharing with other systems in the fixed and fixed-satellite services, in particular the determination of the appropriate geographical separation from feeder links in the broadcasting-satellite service;

4 that WRC-99 should review the results of these studies and consider refinement of the regulatory provisions that might facilitate a broader application of these high altitude platform technologies,

*instructs the Director of the Radiocommunication Bureau*

1 that notices concerning high altitude platform stations that were received by the Bureau prior to 22 November 1997, and provisionally recorded in the ITU Master International Frequency Register in accordance with the provisional rule of procedure issued by the Radio Regulations Board, shall be maintained;

2 that from 22 November 1997, and pending review of the sharing studies in *considering h*) and review of the notification process by WRC-99, the Bureau shall accept notices in the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz only for high altitude platform stations in the fixed service and for feeder links for the broadcasting-satellite service, shall continue to process notices for FSS networks (except for feeder links for the broadcasting-satellite service) for which complete information for advance publication has been received prior to 27 October 1997, and shall inform the notifying administrations accordingly.

RESOLUTION COM5-8 (WRC-97)

**FEASIBILITY OF IMPLEMENTING FEEDER LINKS OF NON-GEOSTATIONARY  
SATELLITE NETWORKS IN THE MOBILE-SATELLITE SERVICE IN THE  
BAND 15.43 - 15.63 GHz (SPACE-TO-EARTH) WHILE TAKING INTO  
ACCOUNT THE PROTECTION OF THE RADIO ASTRONOMY  
SERVICE, THE EARTH EXPLORATION-SATELLITE  
(PASSIVE) SERVICE AND THE SPACE RESEARCH  
(PASSIVE) SERVICE IN THE BAND 15.35 - 15.4 GHz**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the band 15.43 - 15.63 GHz (space-to-Earth) is allocated to the fixed-satellite service on a primary basis for use by feeder links to non-geostationary systems in the mobile-satellite service;
- b) that this band is shared with aeronautical radionavigation services on a primary basis;
- c) that No. S4.10 of the Radio Regulations applies to the use of the band by aeronautical radionavigation services;
- d) that, in accordance with No. S5.511B (WRC-95), aircraft stations were not permitted to transmit in the band 15.45 - 15.65 GHz;
- e) that WRC-97 recognized that airborne transmitters were operating in the aeronautical radionavigation service in the 15.43 - 15.63 GHz band;
- f) that the feasibility of designing and operating feeder links in the space-to-Earth direction with the power flux-density limits in Table S21-4 of Article S21 has not been studied by ITU-R;
- g) that the band 15.35 - 15.4 GHz is allocated on a co-primary basis for exclusively passive use by the radio astronomy service, the earth exploration-satellite service and the space research service and protection from harmful interference from space stations is needed;
- h) that No. S5.511A provides that harmful interference shall not be caused to the radio astronomy service by feeder links for the mobile-satellite service operated in the band 15.43 - 15.63 GHz;
- i) that out-of-band emissions from space stations in the mobile-satellite service in the band 15.43 - 15.63 GHz may cause interference to the radio astronomy service in the band 15.35 - 15.4 GHz;

j) that Recommendation ITU-R RA.769-1 specifies the levels of interference which are detrimental to the radio astronomy service which may not be easily met by non-GSO MSS feeder links operating in the space-to-Earth direction,

*invites ITU-R*

1 to study, as a matter of urgency, in preparation for WRC-99, the feasibility of implementing non-GSO MSS feeder links in the band 15.43 - 15.63 GHz, taking into account the above *considerings*;

2 to study, as a matter of urgency, the interference potential of feeder links for NGSO satellites in the mobile-satellite service to the radio astronomy service in the 15 GHz band and develop recommendations to reduce the out-of-band interference,

*resolves*

that WRC-99 should review the results of the above studies and take appropriate action, including possible adjustments in spectrum allocations.

RESOLUTION COM5-9 (WRC-97)

**PROTECTION OF THE FIXED SERVICE IN THE FREQUENCY BAND  
8 025 - 8 400 MHz SHARING WITH GEOSTATIONARY-SATELLITE SYSTEMS  
OF THE EARTH EXPLORATION-SATELLITE SERVICE (SPACE-TO-EARTH)**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that prior to WRC-97, the band 8 025 - 8 400 MHz was allocated to the earth exploration-satellite service (space-to-Earth) on a secondary basis in Regions 1 and 3, except for those countries listed in No. S5.464 of the Radio Regulations;
- b) that the power flux-density limits given in Table S21.4 of the Radio Regulations apply to emissions from space stations of the earth exploration-satellite service (space-to-Earth);
- c) that, for those administrations where the secondary allocation applied before WRC-97, geostationary orbital avoidance was not required for the fixed service and, therefore, the power flux-density limits given in Table S21.4 of the Radio Regulations may give rise to excessive interference to the fixed service;
- d) that the administrations identified by No. S5.462A of the Radio Regulations have adopted provisional power flux-density limits lower than those shown in Table S21.4 to protect the fixed service;
- e) that no studies have been conducted in this frequency band by ITU-R on the power flux-density values to apply to space stations of geostationary-satellite systems in the earth exploration-satellite service where geostationary orbital avoidance has not been implemented by stations of the fixed service,

*considering further*

that the band 8 025 - 8 400 MHz is used extensively by the fixed service in accordance with ITU-R channel arrangements for the 8 GHz band (see Recommendation ITU-R F.386) and is also used by some countries for television outside broadcast applications,

*resolves*

to invite ITU-R to study, as matter of urgency, the required power flux-density limits to be applied to space stations of geostationary-satellite systems in the earth exploration-satellite service (space-to-Earth) in the frequency band 8 025 - 8 400 MHz where orbital avoidance has not been implemented by the fixed service sharing the band,

*urges administrations*

to provide ITU-R with the necessary technical parameters of fixed-service links requiring protection in this frequency band.

RESOLUTION COM5-10 (WRC-97)

**FREQUENCY SHARING IN THE BANDS 1 610.6 - 1 613.8 MHz AND  
1 660 - 1 660.5 MHz BETWEEN THE MOBILE-SATELLITE  
SERVICE AND THE RADIO ASTRONOMY SERVICE**

The World Radiocommunication Conference (Geneva, 1997),

*with a view*

to enabling the mobile-satellite service (MSS) and the radio astronomy service to make the most efficient use of frequency bands allocated to them, having due regard to the other services to which those bands are also allocated,

*considering*

- a) that the bands 1 610.6 - 1 613.8 MHz and 1 660 - 1 660.5 MHz are allocated to the radio astronomy service and the mobile-satellite service (Earth-to-space) on a co-primary basis;
- b) that No. S5.372 of the Radio Regulations states that "harmful interference shall not be caused to stations of the radio astronomy service using the band 1 610.6 - 1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. 2904/S29.13 applies)"; and that Article 36/S29 also points out that emissions from space or airborne stations can be particularly serious sources of interference to the radio astronomy service;
- c) that the nature of objects studied by the radio astronomy service in the bands 1 610.6 - 1 613.8 MHz and 1 660 - 1 660.5 MHz demands maximum flexibility in the planning of observation frequencies;
- d) that, in the bands 1 610.6 - 1 613.8 MHz and 1 660 - 1 660.5 MHz, which are shared between the radio astronomy service and the mobile-satellite service, operational constraints are necessary for mobile earth stations of the mobile-satellite service;
- e) that a former ITU-R Recommendation relating to sharing between the mobile-satellite service and the radio astronomy service in the band 1 660 - 1 660.5 MHz noted that further studies were required, particularly in the areas of propagation models and assumptions used for the determination of separation distances;
- f) that Recommendation ITU-R M.1316 may be used in order to facilitate coordination between mobile earth stations and radio astronomy stations in the bands 1 610.6 - 1 613.8 and 1 660 - 1 660.5 MHz;
- g) that no experience has been gained up to now with the use of the Recommendation mentioned in *considering* f);
- h) that the threshold levels of interference detrimental to the radio astronomy service are given in Recommendation ITU-R RA.769-1,

*resolves*

that a future competent conference should evaluate frequency sharing in the bands 1 610.6 - 1 613.8 MHz and 1 660 - 1 660.5 MHz between the mobile-satellite service (MSS) and the radio astronomy service, based upon the experience gained with the use of ITU-R M.1316 and other relevant ITU-R Recommendations,

*invites ITU-R*

to submit a report to that future conference on evaluating the effectiveness of Recommendations aiming to facilitate sharing between the mobile-satellite service and the radio astronomy service,

*urges administrations*

to participate actively in this evaluation.

RESOLUTION COM5-11 (WRC-97)

**USE OF THE FREQUENCY BAND 31.8 - 33.4 GHz FOR HIGH DENSITY  
SYSTEMS IN THE FIXED SERVICE**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that in the frequency band 31.8 - 33.4 GHz, high density systems in the fixed service, if deployed, might cause interference to or receive interference from stations in the existing services and that the priority and degree of protection afforded to each service is a matter for each administration to consider;
- b) that the band 31.8 - 33.4 GHz is allocated on a primary basis to the fixed and radionavigation services and that portions of the band are allocated on a primary basis to the space research (deep space) and inter-satellite services;
- c) that sharing criteria for the fixed and other services in the frequency band 31.8 - 33.4 GHz have not yet been developed within ITU-R,

*resolves*

- 1 that the date of the provisional application of the allocation to the fixed service in the frequency band 31.8 - 33.4 GHz is 1 January 2001;
- 2 that WRC-99 should review this allocation, including the date of 1 January 2001, taking full account of the future requirements and development of the other services to which the band is allocated and available ITU-R studies,

*requests ITU-R*

to conduct, as a matter of urgency and in time for WRC-99, the appropriate studies to determine what criteria would be necessary for sharing between stations in the fixed service and stations in the other services to which the frequency band 31.8 - 33.4 GHz is allocated.

RESOLUTION COM5-12 (WRC-97)

**FREQUENCY BANDS ABOVE 30 GHz AVAILABLE FOR HIGH-DENSITY APPLICATIONS IN THE FIXED SERVICE**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that there is a dramatically increasing demand for high-density applications in the fixed service resulting from the deployment of new mobile networks and from the rapid worldwide deregulation in the provision of local broadband services, including multimedia;
- b) that the frequency range from 30 to about 50 GHz is the range preferred to satisfy initial requirements, as indicated in *considering* a), while the bands above about 50 GHz are preferred for similar applications but which take technical advantage of high atmospheric absorption;
- c) that the lower part of the spectrum above 30 GHz has advantages for the fixed service in areas where longer path lengths are necessary;
- d) that the 38 GHz band is already heavily used by many administrations for high-density applications in the fixed service;
- e) that the needs of other services to which the relevant frequency bands are already allocated must be taken into account;
- f) that the band 37 - 37.5 GHz is being planned for use by the space research service (space-to-Earth) to provide moon-to-Earth and planetary communication links;
- g) that the band 37 - 38 GHz is being planned for use by the space research service to provide space based very long baseline interferometry;
- h) that the deployment of high-density applications in the fixed service in some bands potentially presents sharing difficulties with other primary services allocated to the same band, e.g. the fixed-satellite service;
- i) that operations in the space services, such as in the fixed-satellite service, in those bands used by high-density applications in the fixed service may lead to sharing difficulties;
- j) that there is a need for global harmonization of new and existing allocations of radio frequency bands to facilitate coordination between administrations, encourage development of competitive products through economies of scale, and the worldwide introduction of new telecommunication services, including the provision of reliable global information infrastructure (GII) access at an affordable cost,

*resolves*

that administrations should take into account that the bands 31.8 - 33.4 GHz\*, 51.4 - 52.6 GHz, 55.78 - 59 GHz and 64 - 66 GHz are available for high-density applications in the fixed service, when considering allocations or other regulatory provisions in relation to these bands,

*requests ITU-R*

- 1 to undertake studies leading to the identification of system characteristics of high-density systems in the fixed service in the bands listed in the *resolves*;
- 2 to undertake, as a matter of urgency, studies of technical and operational criteria and of methods to facilitate sharing between high-density systems in the fixed service and other services in the bands listed in the *resolves*,

*urges administrations*

to participate actively in the aforementioned studies by submitting contributions to ITU-R.

---

\* The date of provisional application of this allocation shall be in conformity with Resolution COM5-11.

RESOLUTION COM5-13 (WRC-97)

**USE OF THE FREQUENCY BAND 420 - 470 MHz BY THE EARTH  
EXPLORATION-SATELLITE (ACTIVE) SERVICE**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, 1992) identified an urgent need for assessment and systematic observations of forest cover and rate of forest degradation in tropical and temperate regions;
- b) that during this Conference, many countries agreed to the principle that ITU should take action in response to the need identified by UNCED;
- c) that frequencies around 450 MHz have been identified as having the unique capability to penetrate the canopy of forests and to determine the ground-trunk interaction;
- d) that a bandwidth of about 6 MHz is considered necessary to provide the required resolution,

*recognizing*

- a) that this Conference considered a proposal for a secondary allocation for the earth exploration-satellite (active) service within the frequency band 432 - 438 MHz;
- b) that the Report of the Conference Preparatory Meeting (CPM-97) stated that WRC-97 may deem it appropriate to defer consideration of this agenda item to WRC-99, by which time all relevant studies should be completed;
- c) that CPM-97 concluded that spaceborne sensors cannot be considered technically compatible with terrestrial tracking radars without restriction on the spaceborne sensors;
- d) that measures may be needed to minimize interference to fixed, mobile, mobile-satellite, amateur, amateur-satellite and space operation services,

*resolves*

- 1 to invite ITU-R to study, as a matter of urgency, emission criteria, specific sharing criteria and operational characteristics for spaceborne sensors in the frequency band 420 - 470 MHz, and develop a relevant Recommendation;
- 2 to invite ITU-R to develop an ITU-R Report by the date of CPM-99 on the specific emission and operational characteristics used by the earth exploration-satellite (active) service in order to minimize the potential interference to existing services, and in order to support the selection of a frequency band having the optimal sharing scenarios;
- 3 that, on the basis of proposals from administrations, and taking into account the results of the ITU-R studies, the ITU-R Report mentioned in *resolves* 2, and the CPM-99 Report, WRC-99 should consider provision of up to 6 MHz of frequency spectrum to the earth exploration-satellite (active) service in the frequency band 420 - 470 MHz.

RESOLUTION COM5-14 (WRC-97)

**STUDIES RELATING TO CONSIDERATION OF ALLOCATIONS IN THE  
BROADCASTING BAND 470 - 862 MHz TO NON-GEOSTATIONARY  
MOBILE-SATELLITE SERVICES**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the agenda of this Conference included consideration of the adoption of additional allocations for non-geostationary mobile-satellite services (non-GSO MSS);
- b) that the Report of the 1997 Conference Preparatory Meeting (CPM-97) stated that the Radiocommunication Bureau has identified at least 23 non-GSO MSS networks at frequencies below 1 GHz, at some state of coordination under Resolution 46, and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;
- c) that CPM-97 considered the protection requirements for analogue television in the band 470 - 862 MHz against a narrow-band MSS signal in the most sensitive and least sensitive portions of an analogue television channel and the protection requirements for a digital television channel, based on existing ITU-R Recommendations (BT.655-4, BT.417-4 and IS.851-1);
- d) that CPM-97 stated that the protection ratios for a narrow-band interfering signal in the least sensitive parts of an analogue television channel are to be verified by further studies;
- e) that CPM-97 stated the region of lower protection requirements and commensurately higher permissible interfering power flux-density levels as being 100 kHz from the band edges of an analogue television channel, at least in some countries;
- f) that CPM-97 stated that the interfering effects of a non-GSO MSS transmission will depend on its specific characteristics (e.g. duty-cycle, duration, periodicity, etc.), that interference contributions from sources other than MSS (even those from other broadcasting stations) have to be taken into account, that slightly lower values of field strength to be protected may need to be assumed in countries where television networks are relatively sparse, and that studies on sharing are necessary;
- g) that the permissible aggregate interfering power flux-density resulting from these protection requirements, in some portions of an analogue television channel, may be useful in determining the feasibility of sharing with non-GSO MSS transmitter space-to-Earth links;

- h) that these bands are also allocated in part to fixed and mobile terrestrial systems and radionavigation systems;
- i) that, in many countries, the channels assigned for analogue television may also be used for digital television, and that during the period of parallel operation of analogue and digital television networks the usage of this band for television will increase,

*noting*

- a) that on completion of studies, parts of the bands now allocated to the broadcasting service between 470 MHz and 862 MHz might be considered suitable for worldwide allocation to non-GSO MSS space-to-Earth transmissions;
- b) that the bandwidth required in these television channels may be 1-2% of the total band 470 - 862 MHz to be shared with the above systems;
- c) the need to protect the radio astronomy service in the band 608 - 614 MHz against interference from MSS transmissions, including unwanted emissions,

*resolves*

- 1 to invite ITU-R to carry out studies to determine operational and technical means that may facilitate co-frequency sharing between narrow-band non-GSO MSS (space-to-Earth) transmissions and the services to which the band 470 - 862 MHz is allocated, including the bands where the broadcasting service is also allocated;
- 2 to invite a future competent conference to consider, on the basis of the results of the studies referred to in *resolves* 1, the possibility of making additional allocations on a worldwide basis for non-GSO MSS, taking into account, in particular, *considering* h) and i) above,

*urges administrations*

to participate actively in such studies, with the involvement of interested parties.

RESOLUTION COM5-15 (WRC-97)

**STUDIES RELATING TO CONSIDERATION OF ALLOCATIONS  
IN BANDS AROUND 1.4 GHz FOR FEEDER LINKS OF THE  
NON-GEOSTATIONARY MOBILE-SATELLITE SERVICES  
WITH SERVICE LINKS OPERATING BELOW 1 GHz**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that the agenda of this Conference included consideration of the adoption of additional allocations for non-geostationary mobile-satellite services (non-GSO MSS);
- b) that the Report of the 1997 Conference Preparatory Meeting (CPM-97) stated that the Radiocommunication Bureau has identified at least 23 non-GSO MSS networks at frequencies below 1 GHz, at some state of coordination under Resolution 46 and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;
- c) that CPM-97 stated that due to the extreme sensitivity of radio astronomy observations interference from unwanted (spurious and out-of-band) emissions can be a problem. However, CPM-97 noted that interference to radio astronomy can be avoided using various techniques including low-power transmitter levels, choice of modulation, bit shaping, output filtering and band limiting filters. Use of these techniques can minimize the band separation necessary to meet the recommended interference threshold levels for out-of-band emissions;
- d) that, since CPM-97, one administration has carried out additional analyses and hardware demonstrations with a view to determining the feasibility of sharing between non-GSO MSS feeder links and services such as the earth exploration-satellite (passive), radio astronomy and space research (passive) services in bands around 1.4 GHz;
- e) that factors taken into account by these post-CPM-97 activities in order to protect the passive services around 1.4 GHz from out-of-band emissions include: the use of narrow-band non-GSO MSS feeder-link transmissions; the use of spectrum-efficient modulation methods, such as GMSK, having inherently rapid roll-off of out-of-band emissions; the use, where necessary, of band-pass filters in satellite transmitters and MSS feeder-link transmitting earth stations; and guardbands where necessary;
- f) that factors taken into account by these post-CPM-97 activities concerning sharing with radiolocation include the use of conventional techniques that may be applied in MSS satellite receivers, such as intermediate frequency limiters and time diversity, which have long been employed to protect radiolocation receivers, and techniques such as transmitted waveforms employing time diversity, which have been employed to protect receivers in other services from high-power pulsed radar transmitters,

*recognizing*

that the bands near 1.4 GHz are extensively used by many other services operating in accordance with the Radio Regulations, including fixed and mobile systems,

*noting*

- a) that Resolution 214 (WRC-97) states under *resolves* 1 that further studies are urgently required on operational and technical means to facilitate sharing between non-GSO MSS and other radiocommunication services having allocations and operating below 1 GHz;
- b) that a former resolution identified issues relating to frequency sharing between the mobile-satellite service and terrestrial services at frequencies below 3 GHz as being among the urgent studies required in preparation for WRC-97;
- c) that one administration performed such studies, which were submitted to ITU-R, but these studies could not be considered due to time limitations;
- d) that, since WRC-95, one administration has performed studies on sharing between space and terrestrial services and feeder links near 1.4 GHz for non-GSO MSS systems with service links below 1 GHz,

*resolves*

- 1 to invite ITU-R, as a matter of urgency, to carry out studies to determine the operational and technical measures required to facilitate sharing in portions of the band 1 390 - 1 400 MHz between existing and currently planned services and feeder links (Earth-to-space) for non-GSO MSS systems with service links operating below 1 GHz;
- 2 to invite ITU-R, as a matter of urgency, to carry out studies to determine operational and technical means to facilitate sharing, in portions of the band 1 427 - 1 432 MHz, between existing and currently planned services and feeder links (space-to-Earth) for non-GSO MSS systems with service links operating below 1 GHz;
- 3 to invite ITU-R, as a matter of urgency, to study operational and technical measures required to protect passive services in the band 1 400 - 1 427 MHz from unwanted emissions from feeder links near 1.4 GHz for non-GSO MSS systems with service links operating below 1 GHz;
- 4 to invite WRC-99/a future competent conference to consider, on the basis of completion of studies referred to in *resolves* 1, 2 and 3, additional allocations for feeder links on a worldwide basis for non-GSO MSS systems with service links below 1 GHz,

*urges administrations*

to participate actively in such studies, with the involvement of interested parties.

RESOLUTION COM5-16 (WRC-97)

**ALLOCATION TO THE FIXED-SATELLITE (SPACE-TO-EARTH) SERVICE  
IN THE 41.5 - 42.5 GHz BAND AND PROTECTION OF THE RADIO  
ASTRONOMY SERVICE IN THE 42.5 - 43.5 GHz BAND**

The World Radiocommunication Conference (Geneva, 1997),

*considering*

- a) that this Conference has added a primary allocation to the fixed-satellite (space-to-Earth) service in the band 41.5 - 42.5 GHz in Regions 2 and 3 and in certain countries in Region 1 and that this band is adjacent to the band 42.5 - 43.5 GHz which is allocated, *inter alia*, to the radio astronomy service for both continuum and spectral line observations;
- b) that unwanted emissions from space stations in the fixed-satellite (space-to-Earth) service in the band 41.5 - 42.5 GHz may result in harmful interference to the radio astronomy service in the band 42.5 - 43.5 GHz;
- c) that various technical means may be used to reduce these unwanted emissions from space stations in the fixed-satellite service;
- d) that a limited number of radio astronomy stations worldwide require protection, and that there may be means to limit the susceptibility of radio astronomy receivers to interference,

*taking into account*

the relevant provisions of the Radio Regulations,

*resolves*

that administrations shall not implement fixed-satellite systems in the band 41.5 - 42.5 GHz until technical and operational measures have been identified and agreed within ITU-R to protect the radio astronomy service from harmful interference in the band 42.5 - 43.5 GHz,

*invites ITU-R*

- 1 to study, as a matter of urgency, the harmful interference that space stations in the fixed-satellite (space-to-Earth) service operating in the band 41.5 - 42.5 GHz may cause to stations in the radio astronomy service operating in the band 42.5 - 43.5 GHz;
- 2 to identify technical and operational measures that may be taken to protect stations in the radio astronomy service operating in the band 42.5 - 43.5 GHz, including geographical separation and out-of-band emission limits to be applied to space stations operating in the fixed-satellite service in the band 41.5 - 42.5 GHz, as well as measures that may be implemented to reduce the susceptibility of stations in the radio astronomy service to harmful interference;
- 3 to report on the results of these studies to the CPM of WRC-99,

*urges administrations*

to participate actively in the aforementioned studies by submitting contributions to the ITU-R,

*requests*

WRC-99 to take appropriate action based on these studies.